

Suicide in the United States Air Force:
Relationship among Marital Status and Life Stressors,
Communication of Distress, and Helping Services Utilization
by
Jeffery S. Martin

Master's Thesis submitted to the faculty of the
Department of Medical and Clinical Psychology
Graduate Program at the
Uniformed Services University of the Health Sciences
in partial fulfillment of the requirements for the
degree of Masters of Science
2009

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 23 MAR 2009		2. REPORT TYPE		3. DATES COVERED 00-00-2009 to 00-00-2009	
4. TITLE AND SUBTITLE Suicide In The United States Air Force: Relationship Among Marital Status And Life Stressors,Communication Of Distress, And Helping Services Utilization				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Uniformed Services University Of The Health Science,4301 Jones Bridge Rd,Bethesda,MD,20814				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT Using a retrospective psychological autopsy design, we systematically reviewed 100 suicide death investigations conducted by the United States Air Force (USAF) Office of Special Investigations from 1996-2006. The aim of the study was to advance our understanding of the relationship between marital status, life stressors, distress communication, and help seeking prior to suicide. Married decedents were over 2 times more likely to experience interpersonal conflict as compared to unmarried decedents who were more likely to have no documented life stressor precipitants. While married and unmarried decedents did not differ on the number of distress communications, romantic partners were the most common recipient of suicide intent communications for both groups. Marital status was not a predictor of health care service utilization. In general, health care services prior to suicide were more often utilized by African American service members and less often by officers and those with a history of alcohol problems.					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 60	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

ACKNOWLEDGEMENTS

There are a number of individuals who have contributed to this research. While they deserve more credit and thanks than I can possibly articulate, I would like to attempt to extend my appreciation to as many as I can.

First, I would like to thank Maj Dave Englert and Mr. Alan Farmer from the USAF Office of Special Investigations. Their unwavering support, flexibility, and generosity have been instrumental in the resurrection and completion of this project. Likewise, Col Rick Campise and Col Steve Pflanz, prior Air Force Suicide Prevention Program Managers, have both been major advocates for the initiation and revitalization of this project. Their enthusiasm for having USUHS participate in this research is a testament of their commitment to understanding and reducing USAF suicides. I would also like to thank Drs. Elicia Nademin and David Jobes from Catholic University. As two of the original champions of this project, Drs. Nademin and Jobes have selflessly shared their original work, vast corporate knowledge, and keen guidance throughout my work. Their advice has undoubtedly saved me from numerous pitfalls that only those with firsthand experience can provide. Drs. Rusan Chen, Andrew Waters, and Cara Olsen provided superb statistical and methodological expertise that helped to bring the study's hypotheses into tighter focus, insured that the analytic strategy was sound, and forced me to use more clarity and precision in my writing.

An enormous thanks clearly belongs to all personnel in the Holloway lab. They have spent countless hours coding cases, providing input into coding and research decisions, and have repeatedly given insightful, yet gentle, feedback on the hypotheses, methodology, and presentations. Collectively, they intuitively sensed when I reached task saturation and would tactfully step-in to provide even more assistance. Your kindness did not go unnoticed.

Most importantly, I would like to thank Dr. Marjan Ghahramanlou-Holloway. She has actively mentored me through every aspect of this research; from conceptualization to completion. Her patience, mentorship, ambition, passion for suicide research, and tireless commitment to my development as a scientist-practitioner are awe-inspiring. Thank you Marjan for affording me the opportunity to participate in research that is relevant and meaningful to the military. I truly could not have done it without you.

Finally, I would like to thank the individuals and their loved ones who we, in some ways, come to know through each suicide case file. Although our knowledge and understanding of their life experience is brief and incomplete, it is my hope that we do not miss the lessons they have to teach.

APPROVAL SHEET

Title of Thesis: Suicide in the United States Air Force: Relationship among Marital Status and Life Stressors, Communication of Distress, and Helping Services Utilization

Name of Candidate: Jeffery S. Martin
Department of Medical and Clinical Psychology
Master of Science
2009

Thesis and Abstract Approved:

Marjan G. Holloway, Ph.D.

Marjan Ghahramanlou-Holloway, PhD.
Committee Chairperson

9-24-09

Date

Andrew Waters

Andrew Waters, Ph.D.
Committee Member

9/23/2009

Date

Rusan Chen

Rusan Chen, Ph.D.
Committee Member

9/23/2009

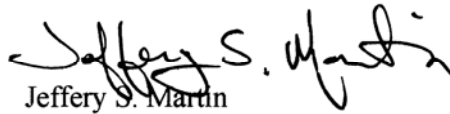
Date

The author hereby certifies that the use of any copyrighted material in the thesis manuscript entitled:

“Suicide in the United States Air Force:
Relationship among Marital Status and Life Stressors,
Communication of Distress, and Helping Services Utilization”

is appropriately acknowledged and, beyond brief excerpts, is with the permission of the copyright owner.

The opinion expressed in this Master Thesis reflects the view of the author and committee and do not reflect the opinion of the Department of Defense or the United States Government.

A handwritten signature in black ink, reading "Jeffery S. Martin". The signature is fluid and cursive, with the first name "Jeffery" being more prominent and the last name "Martin" following in a similar style.

Jeffery S. Martin
Department of Medical and Clinical Psychology
Uniformed Services University of the Health Sciences

ABSTRACT

Title of Thesis: Suicide in the United States Air Force: Relationship among Marital Status and Life Stressors, Communication of Distress, and Helping Services Utilization

Author: Jeffery S. Martin

Thesis Director: Marjan Ghahramanlou-Holloway, PhD.

Using a retrospective psychological autopsy design, we systematically reviewed 100 suicide death investigations conducted by the United States Air Force (USAF) Office of Special Investigations from 1996-2006. The aim of the study was to advance our understanding of the relationship between marital status, life stressors, distress communication, and help seeking prior to suicide. Married decedents were over 2 times more likely to experience interpersonal conflict as compared to unmarried decedents who were more likely to have no documented life stressor precipitants. While married and unmarried decedents did not differ on the number of distress communications, romantic partners were the most common recipient of suicide intent communications for both groups. Marital status was not a predictor of health care service utilization. In general, health care services prior to suicide were more often utilized by African American service members and less often by officers and those with a history of alcohol problems.

Table of Contents

Title Page	1
Acknowledgements	2
Approval	3
Copyright Statement	4
Abstract	5
Table of Contents	6
List of Tables	8
List of Figures	9
Introduction	10
Background	10
Risk and Protective Factors	11
Life Stressor precipitants	12
Communication of Suicide Intent and Distress	13
Helping Services Utilization	14
Marital Status	15
Psychological Autopsy Methodology	16
Summary & Hypotheses	18
Research Design & Methods	21
Sample	21
Measure	22
Procedure	23
Research Design	24

Data Analytic Strategy	25
Results	27
Sample Characteristics	27
Hypothesis 1	28
Hypothesis 2	30
Hypothesis 3	31
Discussion	33
Findings and Comments	34
Strengths and Limitations	38
Implications and Future Directions	40
Tables	43
Figures	50
References	52

List of Tables

Table 1. Sample Demographics

Table 2. Life Stressor Precipitants and Communication Prior to Suicide

Table 3. Number of Documented Life Stressor Precipitants for 24 Hours Prior to Suicide

Table 4. Percentage of Helping Services Utilization 30 Days Prior to Suicide

Table 5. Percentage of Helping Services Utilization 12 Months Prior to Suicide

Table 6. Logistic Regression Analysis of Predictors of Health Care Services Utilization

30 Days Prior to Suicide

Table 7. Logistic Regression Analysis of Predictors of Health Care Services Utilization

12 Months Prior to Suicide

List of Figures

Figure 1. Interpersonal Conflicts among Married and Unmarried Decedents

Introduction

Public Health Significance of Suicide

Suicide, as the 4th leading cause of death amongst 18-65 year-olds, is a serious public health problem which claims the lives of approximately 30,000 Americans annually (WISQARS, 2007). In the U.S. military, suicide generally ranks as the second most common cause of death next to accidents (Ritchie, Keppler, & Rothberg, 2003). Available data from 1996 to 2007 indicates that the average suicide rate for the Department of Defense (DoD) was 12.2/100K (DoD, 2009). For this same time period, the average suicide rate for each U.S. branch of service in rank order was: Air Force (10.1/100K), Navy (11.1/100K), Army (13.6/100K), and Marine Corps (14.4/100K). Corrections of reporting and classification errors may increase the reported suicide rates in the military by as much as 21% (Carr, Hoge, Gardner, & Potter, 2004).

From 1990-1994, suicide rates across the U.S. Air Force (USAF) increased from 10.0/100K to 16.4/100K, accounting for 23% of all active duty deaths (CDC, 1999). In response, the Air Force Suicide Prevention Program (AFSPP) issued 11 initiatives aimed at prevention, heightened community and personal awareness of risk, early intervention, social support, coping skills, and stigma reduction associated with help seeking behavior. Knox et al. (2003) found a 33% relative risk reduction of suicide in those exposed to the AFSPP, with suicide rates decreasing from 12.4/100k in 1996, the year the program was implemented, to 5.6/100k in 1999. In 2003, the suicide rate since implementation of the AFSPP was cited to be 9.6/100k (Knox et al., 2003). However, due to a rise in AF suicides observed in 2002 (10.2/100k), 2004 (13.1/100k), and 2006 (12.1/100k) the

relative risk reduction attributable to the AFSPP has been adjusted from 33% to 28% (DoD, 2009).

Risk and Protective Factors for Suicide

Descriptive and analytic epidemiological studies have established several risk factors associated with suicide behavior such as male gender, increasing age, personal or family history of mental illness or suicide behavior, Caucasian and Native American race, access to firearms, substance disorders, impulsivity, life stressors including relational problems, and hopelessness (DHHS, 2007; Moscicki, 1995; Nock et al., 2008; Resnick et al., 1997). Prospective studies (e.g., Brown, Beck, Steer, & Grisham, 2000) support the epidemiological findings that self-reported hopelessness is a highly sensitive predictor of suicide. Conversely, restricting access to firearms, perceived social support and connectedness, commitment to a religion, being married or in a committed relationship have been shown to be protective factors (Humeau et al., 2007; Mann et al., 2005; Nock et al., 2008; Smith, Mercy, & Conn, 1988).

While the risk factors cited in the civilian literature have also been observed in military suicides, there are several unique features found within the military population that may limit the generalizability of civilian findings to the military (see Martin, Ghahramanlou-Holloway, Lou, & Tucciarone, 2009). Most of what we know about suicide in the military population is derived from research using suicide surveillance databases, retrospective chart reviews, and mortality registries. Similar to civilian findings, as many as 90% of military personnel who die by suicide have a diagnosable psychiatric disorder at the time of death (Allen, Cross, & Swanner, 2005). While early research suggested that substance use was not a major factor in military suicides

(Hauschild, 1968), more recent studies indicate that alcohol use is implicated in military suicide attempts and most suicide deaths (Allen et al., 2005; Patterson, Jones, Marsh, & Drummond, 2001). In fact, frequent intoxication, bingeing, and drinking related charges were the top behavioral indicator found in both Navy and Marine suicides (Stander, Hilton, Kennedy, & Robbins, 2004). Moreover, military deployments are considered to be stressful life events associated with suicide correlates such as strained romantic relationships and symptoms of trauma and depression (Hoge, Auchterlonie, & Milliken, 2006). Of note, failed or failing interpersonal relationships are cited to be the top life stressor precipitant in military suicide events (ASER, 2007; Levin, 2008; Patterson et al., 2001; Ritchie et al., 2003). In contrast, mandatory population-based suicide prevention and screening programs, annual medical screenings, military culture and lifestyle, and pre-screening prior to entrance may serve as unique protective features.

Background for Current Study

The current study focuses on the following four potential factors associated with suicide risk within an Air Force sample of suicide decedents: 1) life stressor precipitants; 2) communication of distress and suicide intent; 3) helping services utilization; and 4) marital status. A brief review of these four areas is provided below.

Life Stressor Precipitants. Individuals who die by suicide are more likely to have experienced recent adverse life events such as interpersonal conflict or loss as compared to controls (Cavanagh et al., 1999; Cheng, Chen, Chen, & Jenkins, 2000; Phillips et al., 2002). Identifiable precipitants such as separations, interpersonal conflicts, and loss of employment have been shown to be present in the month prior to death for up to 80% of decedents, with as many as half occurring in the final 24 hours (Kolves, Varnik, Schneidere, Fritzee, & Allik,

2006; Mattunen, Aro, & Lonnqvist, 1993). One study noted that the majority of surviving spouses (68%) perceived their recent separation (i.e., within three months of suicide) as the most critical precipitant (Heikkinen, Aro, & Lonnqvist, 1992). In serious suicide attempts, the top three most common precipitants were the end of a romantic relationship, other interpersonal difficulties, and financial problems (Beautrais, Joyce, & Mulder, 1997). Cheng et al. (2000) psychological autopsy study found that persons who died by suicide were almost 10 times more likely than controls to have suffered a “loss event,” such as loss of health, a person, a cherished idea, and employment/material possession. Similarly, military suicide research has noted that failed or failing interpersonal relationships, military deployments, work related problems or dissatisfaction, disciplinary or legal problems, alcohol misuse, are several of the frequent stressors antecedent to military suicide events (ASER, 2007; Bullman & Kang, 1996; IOM, 2007; Levin, 2008; Patterson et al., 2001; Ritchie et al., 2003; Stander et al., 2004; Trent, 1999).

Communication of Suicide Intent and Distress. Depending on the definition used, 33-80% of those who die by suicide communicate their suicide intent to a spouse, family member, or friend in the months prior to death (Canter, Giles, & Nicol, 2004; Isometsa, 2001; Robins, Gassner, Kayes, Wilkinson, & Murphy, 1959). Robins et al. (1959) reported that 41% of suicide decedents made explicit statements about intent to die by suicide, 24% made comments that they would be better off dead, and 22% stated the desire to die. The top five recipients of these communications were spouses (60%), relatives (51%), friends (35%), physicians (18%) and job associates (5%). Research examining themes found in suicide notes supports that guilt, shame, burdensomeness, unbearable psychological pain, cognitive constriction, and hopelessness are common themes communicated by those that die by

suicide (Foster, 2003; Leenaars et al., 1992; Shneidman, 1996). Little is known about the number of military members that communicate their suicide intent prior to death. Available data on US Army suicides suggest that the majority do not (ASER, 2007). Of the 25% who did communicate their intent prior to suicide death, recipients of the communication, in order of frequency, were: spouse, friend, other, mental health staff, and chaplain. Of attempted suicides, friends and mental health staff were tied as the top recipient of the communication. Staal & Hughes (2002) found a similar difference between attempters and completers within the USAF population. Specifically, attempters were more likely to have been identified by mental health providers as compared to those that died by suicide. They hypothesized that death by suicide may be conceptualized as a “failure to seek help.”

Helping Services Utilization. Of civilians who die by suicide, 45-75% have been in contact with a physician in the 30 days prior to death, whereas only one-quarter have been in contact with mental health professionals (Luoma, Pearson, & Martin, 2002; Vastag, 2001). Males and older individuals (e.g., ages 55 or older) appear to be less likely to access mental health services but older individuals have higher rates of contact with primary care (Lee, Lin, Liu, & Lin, 2008). Despite high use of primary care services prior to death, many persons at risk go undetected (Claassen & Larkin, 2005). Army data suggests that one-third to two-thirds have been in contact with the military health system in the month prior to death (ASER, 2007). Among Navy and Marine suicides 1999-2001, 30% and 19% respectively, accessed mental health services in the year prior to death. In the month prior to death, 14% of Navy decedents and 5% of Marine decedents accessed mental health services (Stander et al., 2004). To our knowledge, similar data for USAF suicides has yet to be reported. Epidemiological studies indicate that individuals who

have never been married or have experienced a disrupted marital status (i.e., separated, widowed, or divorced) are more likely to utilize health care services (Lin, Goering, Offord, Campbell, & Boyle, 1996; Wang et al., 2005). Findings regarding race and help seeking are mixed with some reporting that African Americans are more likely to seek mental health services and Caucasians more likely to use traditional medical sources (Broman, 1987), while others have found the opposite (Neighbors, 1985).

Marital Status. In general, marriage appears to play a protective role against suicide, particularly for men (Goldsmith, Pellmar, Kleinman, & Bunney, 2002). Divorced and separated men are at significantly higher risk to die by suicide than married individuals (Kposowa, 2000). Cantor & Slater (1995) reported that divorced and separated individuals were up to six times more likely to die by suicide as compared to married or cohabitating individuals. Kposowa (2000) also found increased risk for suicide among separated men, but not women, positing that suicide risk may be particularly elevated immediately after separation. In a recent study, separation conferred over four times greater risk than any other marital status (Wyder, Ward, and De Leo, 2008). Wyder and colleagues (2008) hypothesized that the elevated risk in separated individuals may be related to temporal proximity; with separation being closer to the turmoil and stress of the initial break up as compared to divorce. Despite the findings that married persons are at lower risk for suicide as compared to single, divorced, or widowed (Smith et al., 1988), quality of the relationship appears to be an important consideration. Low levels of marital integration and marital dissolution have been found to be associated with worsened mental and physical health, as well as suicide (Prigerson, Maciejewski, & Rosenheck, 1999; Stack & Wasserman, 1993).

Theoretical Model

While there is no one accepted theory of suicide, several have been proposed that build upon the biopsychosocial factors associated with suicide (see Berman, Jobes, & Silverman, 2006). Joiner's (2005) interpersonal-psychological theory of suicide was selected as the theoretical grounding for the current study. It posits that three components are necessary for an individual to engage in lethal suicide behavior: *perceived burdensomeness*, *thwarted belongingness*, and an *acquired capability for self-harm*. Thus, if an individual perceives to be ineffective to the point where others are burdened by his/her existence (e.g., burdensomeness), does not feel interpersonally connected to a valued group or relationship (e.g., belongingness), and has had previous experiences that have habituated one to fear, pain, and taboo of suicide (e.g., acquired capability), such as history of facing violence or pain, he/she is at risk for suicide. Each component of Joiner's theory, perceived burdensomeness (Brown, Comtois, & Linehan, 2002; Joiner et al., 2002), thwarted belongingness (Stirman & Pennebaker, 2001), and acquired capability (Nademin et al., 2008) have growing empirical support.

Psychological Autopsy Methodology

While epidemiological data lead to the identification of factors associated with suicide and provide a framework for comparing mortality rates between populations at the macro level, death by suicide is an extremely complex, highly personal event. As such, it often occurs in the context of a convergence of multiple distal and proximal risk factors. The most direct research methodology currently available to reconstruct the life context to examine associations between antecedents and suicide death is the psychological autopsy (Cavanagh, Carson, Sharpe, & Lawrie, 2003). The psychological autopsy (PA) has evolved

beyond its original inception as a forensic tool in determining manner of death in equivocal deaths (i.e., natural, accident, suicide, or homicide) into a research tool for describing (i.e., case-series) or comparing (i.e., case-controlled) antecedents of suicide death. In all applications, the intent is to reconstruct the victim's lifestyle and context with particular attention to period of time immediately preceding death (Shneidman, 1994). Various sources of information are synthesized to include interviews with individuals close to the decedent; medical autopsy; psychiatric, medical, and substance use history; personality factors; interpersonal relationships; financial and legal history; recent life events and stressors; communications of suicide ideation, intent or gestures of suicide. As of 2003, there were over 150 PA studies cited in the international suicide literature (Cavanagh et al., 2003).

Findings from PA studies support, enhance, and clarify epidemiological data. Meta-analyses, systematic reviews and single-site PA studies indicate that psychiatric disorders, especially Major Depressive Disorder, are present in 30-90% of all suicides (Arsenault-LaPierre, Kim, & Turecki, 2004; Isometsa, 2001), the majority of which are untreated or undertreated at the time of death (Isometsa, 2001). Substance related disorders are present in 26-55% of suicide deaths and are more prevalent in male suicides (Arsenault-Lapierre et al., 2004; Rihmer, 2007). As compared to controls, suicide decedents are more likely to be socially isolated, be in contact with health care services in the month prior to death, communicate suicide intent to others, and have comorbid psychiatric/substance use disorders as well as a history of self-harm behavior (Cavanagh et al., 2003; Chen et al., 2006; Clark & Horton-Deutsch, 1992; Isometsa, 2001). Despite the repeated findings that the majority of those who die by suicide have a diagnosable mental health disorder and many have been in contact with health care services in the

month(s) prior to death, it has been reported that less than half receive mental health treatment (Clark & Horton-Deutsch, 1992).

In a case-controlled PA study, Nademin and colleagues (2008), compared data extracted from a subsample of the current study sample of USAF suicide death investigation files ($n = 60$) to data collected from a living active duty USAF sample ($n = 122$) in order to examine the utility of Joiner's (2005) interpersonal theory of suicide to discriminate between suicide cases and controls. The acquired capability to commit suicide subscale of the *Interpersonal-Psychological Survey* distinguished between these two groups. Caucasians were at greatest risk compared to other race (i.e., all other races collapsed into "other") and divorcees were over three times more likely to die by suicide as compared to married individuals. Although marriage is typically considered to be a protective factor, they proposed that military lifestyle may interact with marriage in some way that perhaps alters this protective function. The current study, as described below, extends the earlier project (Nademin et al., 2008) in a collaborative effort with the AFSP, the Air Force Office of Special Investigations (AFOSI), and various subject matter experts in the field of suicidology to offer a better understanding of the person's life events and help seeking behavior prior to death.

Purpose and Significance

The primary purpose of the current study was to examine available suicide death investigation data collected by the AFOSI. The three broad areas of inquiry were 1) life stressor precipitants of suicide death, 2) verbal communication of suicide intent (i.e., source and themes), and 3) documented utilization of helping services for the periods of 30 days and 12 months prior to suicide death. Findings based on a preliminary

examination of the aggregate data were utilized to inform the AFSPP efforts in addressing the problem of suicide behavior among Air Force personnel.

Since relationship difficulties are recognized as the most imminent suicide risk factor for military service members, we evaluated the role of marital status in relation to various data collected on AF suicide deaths. More specifically, we examined how married decedents differ from unmarried decedents on several observed variables such as demographics, life stressor precipitants, suicide intent and distress communication, and helping services utilization. The decision to compare married to unmarried decedents was based on the existing suicide literature which identifies marriage as a protective factor (Goldsmith et al., 2002) and problematic interpersonal relationships as a prominent risk factor (Patterson et al., 2001). If married and unmarried USAF members who die by suicide have characteristically different life stressor precipitants, communication patterns, and help seeking behaviors, AFSPP efforts may be enhanced by considering the unique intervention needs for each subgroup.

Hypotheses

To examine how married and unmarried decedents differ in the *number and types of life stressor precipitants* noted in the investigatory files, we hypothesized the following: H1) married individuals would demonstrate a significantly higher number of documented life stressor precipitants in the 24 hours prior to suicide death than unmarried individuals; and H2) married individuals as compared to unmarried individuals would be more likely to have experienced interpersonal conflicts prior to suicide death.

To examine how married and unmarried decedents differ in the *verbal themes conveyed in communication of distress*, we hypothesized the following: H3) verbal

themes, communicated prior to death, related to interpersonal issues would be ranked higher than other themes for married individuals; and H4) interpersonally-driven verbal themes of distress communication were more likely to have occurred as compared to other themes for the entire sample.

To examine how married and unmarried decedents differ in the *source of suicide intent communication* in the 30 days prior to suicide death, we hypothesized that H5) unmarried individuals were more likely to communicate suicide intent to peers and professionals.

To evaluate how married and unmarried decedents differ in their *utilization of available helping services* prior to suicide, we hypothesized the following: H6) unmarried individuals as compared to married individuals would be more likely to access mental health services in the 30 days prior to death; H7) primary care services were more likely to have been accessed/utilized as compared to other helping services for the entire sample; and H8) marital status would be a significant predictor of accessing health care services in the 30 days prior to death when controlling for rank, race, and alcohol problems history.

Method

Sample

Our sample ($N = 100$) was drawn from 411 closed AFOSI cases of active duty USAF personnel who died by suicide during the time period 1996 to 2006. Coding was conducted in two separate time periods with the first time period resulting in 60% of the included cases reported in this study and the second time period resulting in 40% of the included cases. The manner of case selection differed for the two time periods. In the first time period, cases were *randomly* selected for coding from the 10-year pool as part of a

dissertation project (see Nademin et al., 2008). In the second time period, cases were *consecutively* selected from registered suicides dated post December 31, 1999. The decision to shift to a non-random case selection method was due to a broader AFOSI objective to enter all death cases since 2000 entered into a data registry. Active case files still under investigation were excluded.

Each AFOSI investigative file contains information collected following an active duty Air Force suicide. The file includes the following documents: a) interviews conducted by the AFOSI staff with persons known to the deceased (e.g., family, friends, coworkers); b) relevant records such as personnel, medical, mental health, and financial; c) toxicology and medical autopsy reports; as well as d) collected evidence from the death scene (e.g., suicide note).

Human Subjects Protection

Permissions to access suicide death files were obtained from the AFOSI, the AFSP, and the Malcolm Grow Medical Center Institutional Review Board.

Measures

Suicide Death Investigation Template (SDIT; Appendix A). Extraction of data from the investigative files was conducted via the usage of the SDIT consisting of 485 variables grouped into 6 general areas of interest: demographics, military specific information, suicide event, risk factors, protective factors, and helping services utilization. While the majority of variables captured by the SDIT were dichotomous (yes/no), there were also categorical, continuous, and open-ended response formats.

Demographic information included factors such as age at the time of death, sex, race, and religion. Military specific information consisted of factors such as rank, job

specialty, number of assignments, temporary duties and deployments, and combat exposure. Information about the suicide event related to suicide location and scene (e.g., pictures of the deceased at the time of discovery and summaries of evidence collected from death scene such as gun, suicide note), possible suicide-preparatory behavior (e.g., alcohol, syringe), precipitants in the 24 hours prior to death, method of suicide, and post-mortem toxicology reports. Additional information related to suicide intent such as lethality of the method, recipients of pre-suicide communications, and themes represented in written or verbal communications (e.g., psychological pain, loneliness) were noted.

The collection of information pertaining to risk and protective factors was conducted by a review of the decedent's history. A positive history of personality characteristics and life events such as suicide behavior, substance use, family and relational problems, psychiatric diagnoses, exposure to suicide, past abuse or trauma, legal or financial problems, impulsivity, usage of psychiatric medications, religious practice along with other factors were noted. The helping services section of the SDIT captured information related to who recognized risk, what they observed, who they referred the decedent to, and adequacy of the referral. In addition, the frequency and the temporal proximity of a decedent's utilization of the following nine available helping services were coded: military treatment facilities (MTF), mental health clinic (MHC), family advocacy services (FAS), family support (FS), legal services (LS), chaplain services (CS), alcohol and drug abuse prevention and treatment (ADAPT), financial counseling (FC), and child/youth services (CYS).

The SDIT and a corresponding coding manual (Appendix B) were developed by a team of subject matter experts in suicidology¹. The SDIT coding manual was created to increase reliability of coding decisions across coders. A random sampling procedure was used to select 10% of coded cases for an inter-rater reliability check. Reliability was found to be high across coded variables with kappa coefficients ranging from 0.6 to 1.0 (Nademin et al., 2008).

Procedure

Twelve trained coders with a minimum of a Bachelor's degree were tasked to extract data from the suicide death investigation files. All coders received an introduction to the study and individual training on using the SDIT and coding manual. Coding sessions were conducted at times and locations approved by the AFOSI. At each session, coders were briefed on any project updates, provided a digital copy of the SDIT, a coding manual, and a single AFOSI case file. Coders performed a brief initial review of their respective suicide death files and entered data into the SDIT during the second viewing. If an SDIT variable was not annotated in the suicide file, coders were instructed to assume that it was not present and code accordingly.

Research Design

A retrospective psychological autopsy methodology was the research design of this study. While a case-controlled psychological autopsy study has a number of methodological strengths, ultimately, the choice of controls or design should be based on the specific questions for research (Hawton et al., 1998). Since our primary goal was to examine the relationship between the suicide *decedent's marital status* and life stressor

¹ SDIT developers included David Jobes, Thomas Joiner, Barry Wagner, David Rudd, Elicia Nademin, the Air Force Suicide Prevention Program Manager, Col Rick Campise, and the AFOSI Chief, Behavioral Analysis Division, Maj David Englert.

precipitants, communication of suicide intent, and helping service utilization prior to death, the decision to compare a cross-section of married and unmarried suicide decedents was deemed as most appropriate. Moreover, this decision mitigates some of the limitations noted in case-controlled designs. Specifically, since all cases have died by suicide, the recall biases among informants that may differ between cases and controls is expected to be equivalent between groups. Similarly, since our design is a cross-sectional comparison of USAF suicide deaths, the two subsamples used for comparisons are homogeneous and comparable. Finally, since all death investigations were conducted by the AFOSI, methods and sources used for gathering information were equivalent among all cases.

Data Analytic Strategy

Number and Type of Life Stressor Precipitants. To determine the number and the types of life stressor precipitants of suicide for married and unmarried individuals in the 24 hours preceding death, two new variables were derived from combining individual SDIT variables. An SPSS count function was employed to determine the *number* of life stressor precipitants for each case (0 = minimum; 19 = maximum). A Mann-Whitney U statistic was used to compare the total number of life stressor precipitants of married and unmarried cases. To determine the *types* of life stressor precipitants observed in the sample, individual SDIT variables pertaining to relational difficulties were first collapsed to create a dichotomous (yes or no) “*interpersonal conflict - life stressor precipitant*” variable. The variable was constructed by using data from the following fields: argument or fight with spouse, significant other, or family; infidelity of spouse or decedent; or end of relationship with spouse, significant other, or family. Similarly, individual SDIT

variables pertaining to non-relational difficulties were then collapsed to create a dichotomous (yes or no) “*other - life stressor precipitant*” variable. This variable was constructed by using data from the following fields: death of family or friend; arrest or detainment; alcohol or drug-related incident; military or civilian legal proceedings; non-select for promotion; significant medical condition or diagnosis; and acute financial crisis. Married and unmarried cases were then compared on interpersonal or other life stressor precipitants using a Chi-square statistic.

Themes of Distress Communication. To examine themes of distress communicated by decedents in the 30 days prior to suicide, two new variables were created. Individual SDIT variables of revenge, rejection, shame, burden to others, thwarted-belonging, loneliness, and missing friends were collapsed into a dichotomous (yes or no) variable “*interpersonal themes*”. Similarly, the SDIT variables of psychological pain, stress, agitation, hopelessness, self-hate, loss of status, depression, and anger were collapsed to create the variable “*intrapersonal themes*”. A Mann-Whitney test was used to determine whether married individuals communicated interpersonally-driven verbal themes of distress more frequently than unmarried individuals prior to death.

Communication of Suicide Intent. To determine whether married individuals as compared to unmarried individuals were more likely to communicate their suicide intent to peers and professionals, a new dichotomous variable (yes or no) was constructed. The following recipients of suicide intent communication captured in the SDIT were collapsed to create the variable “*peers and professionals*”: friend, helping agency, and military chain of command. A Chi-square statistic was used to compare the frequency of

communicating suicide intent to peers and professional for married versus unmarried cases.

Helping Services Utilization. To assess utilization of available helping services in the 30 days prior to death, a series of Wilcoxon Signed Ranks tests were used to compare observed rankings for the nine categories of helping services. To determine whether marital status was associated with an individual accessing any available helping services, a new variable (“*accessed any available services*”) was created that collapsed all helping services into a dichotomous (yes or no) variable. Two Chi-square tests were ran to determine whether married and unmarried cases differed in accessing outpatient mental health clinic services or any helping services in the 30 days prior to death.

To assess the relationship between marital status and utilization of helping services, four new dichotomous variables were created: “*health care services 30 days prior to death*”, “*health care services 12 months prior to death*”, “*mental health services 30 days prior to death*”, “*mental health services 12 months prior to death*”. Cases were coded as “yes” for health care services if decedents accessed a military medical treatment facility (MTF) or outpatient mental health clinic in the 30 days or 12 months prior to death. Cases were coded as “yes” for mental health services if decedents accessed an outpatient mental health clinic, alcohol and drug abuse prevention and treatment (ADAPT), or family advocacy program. A logistic regression was used to determine if marital status was a significant predictor of accessing health care services in the 30 days to death when controlling for rank, race, and alcohol problems history. An exploratory logistic regression using the same predictor variables was also used to assess health care services utilization in the 12 months prior to death.

Results

Sample Characteristics

The sample consisted of 100 deceased USAF personnel case files from the AFOSI archived files, investigated between 1996 and 2006. The sample was overwhelmingly male ($n = 94$). Average age at time of death was 31.63 ($SD = 8.4$), with ages ranging from 19 to 59. Decedents were predominately enlisted personnel ($n = 89$) with over two times as many from the ranks of E4-E6 as compared to other ranks (Table 1). There were a comparable number of married ($n = 52$) and unmarried ($n = 48$) decedents. Of married individuals, the majority (67%) had been married only once. Of unmarried individuals, 60% were single and never married. The racial composition of the sample was largely Caucasian (72%), followed by African American (13%), Hispanic (8%), Asian (5%), other (1%), and unidentified (1%).

Twenty-one percent of the sample had some type of alcohol problem history documented prior to death. These included either a DSM diagnosis of alcohol abuse/dependence (8%), a legal charge of driving under the influence (13%), or both (3%). When other potential markers of alcohol problems were included (e.g., missing work due to drinking, excessive drinking known to others, underage drinking, public intoxication, or drinking on the job), 41% of the sample were represented.

Life Stressor Precipitants 24 Hours Prior to Suicide

Approximately 74% of the sample had one or more documented life stressor precipitant in the 24 hours prior to suicide (Table 2). Slightly over half of the sample had experienced interpersonal conflicts in the 24 hours prior to death such as the end of a romantic relationship (34%); argument with spouse (31%), significant other (17%), or

family member (2%); infidelity of a spouse (9%) or decedent (5%); and physical fight with spouse (2%) or family member (2%). Two-fifths of the sample had experienced life stressor precipitants not related to interpersonal concerns, such as military reprimand or non-judicial punishment (15%); military (14%) or civilian (5%) legal proceedings, acute financial crises (10%), alcohol related incident (8%), diagnosis of a serious medical condition (6%), death of a family member or friend (5%), arrest for a non-alcohol related offense, or non-selection for promotion (3%). There were 20% of case files that noted both interpersonal and other life stressor precipitants.

Marital Status and Life Stressor Precipitants 24 Hours Prior to Suicide

A Mann-Whitney test was used to determine the differences between married ($M = 1.88, SD = 1.52$) and unmarried ($M = 1.54, SD = 1.56$) decedents in the number of documented life stressor precipitants 24 hours prior to suicide. The decision to use the Mann-Whitney test, as opposed to an independent t-test, was based on the Kolmogorov-Smirnov test of normality which confirmed that total number of life stressor precipitants ($z = 1.88, p = .000$) and marital status ($z = 3.51, p = .002$) were significantly non-normal. The average number of life stressor precipitants observed for married decedents ($M = 7.43$) as compared to unmarried decedents ($M = 6.86$) were not significantly different ($U = 1067, z = -1.28, p = .199$). Thus, the hypothesis that married individuals would demonstrate a significantly higher number of life stressor precipitants 24 hours prior to suicide than unmarried individuals was not supported.

Out of the 26% of suicide cases where no life stressor precipitants was noted, 65% were unmarried (Table 3). Due to the observation that there were almost twice as many unmarried ($n = 17$) than married ($n = 9$) individuals with an absence of documented

life stressor precipitants (Figure 1), an exploratory Chi Square analysis was conducted. The groups were significantly different $\chi^2(1) = 4.25, p = .039$, with unmarried individuals being 62% more likely to have no documented life stressor precipitants as compared to married individuals ($OR = .38, 95\% CI = .15 - .97$). According to guidelines provided by Rea & Parker (1992), the estimated effect size for this finding was moderate ($V = .21$).

To test whether married individuals were more likely to have experienced interpersonal conflicts prior to suicide than unmarried individuals, a Chi-Square test was conducted. This non-parametric statistic was selected due to the nominal nature of these data which violates the assumption of normality required for parametric tests. It was verified that minimum cell counts of married with interpersonal conflict ($n = 35$) and unmarried with interpersonal conflict ($n = 19$) exceeded five. There was a significant association between marital status and retrospective findings of one or more interpersonal conflicts prior to suicide event, $\chi^2(1) = 7.72, p = .005$. The odds that a decedent had interpersonal conflicts in the 24 hours prior to death was over 2 times higher among married individuals ($OR = 3.14, 95\% CI = 1.39 - 7.13$). The estimated effect size for this finding was moderate ($V = .28$).

Marital Status and Themes of Distress Communication 30 Days Prior to Suicide

There were a total of 16 verbal themes of suicide distress communication captured in the SDIT. Many decedents communicated multiple themes of distress. Sixty-six percent of the sample communicated themes related to intrapersonal distress, with stress, depression, and psychological pain ranking as the top three intrapersonal themes. As seen in Table 2, 55% of the sample communicated themes related to interpersonal distress, with thwarted belongingness, rejection, and loneliness ranking as the three most common

interpersonal themes. Due to the low number of frequencies observed for each individual themes of distress, the themes were categorized by research team consensus into either interpersonal or intrapersonal domains and compared as described earlier. To determine whether married individuals communicated interpersonally-driven verbal themes of distress more frequently than unmarried individuals prior to death, a Mann-Whitney test was used. The total number of interpersonally-driven verbal themes of distress for married decedents ($M = 8$) as compared to unmarried decedents ($M = 8.67$) were not significantly different, $U = 1212$, $z = -.26$, $p = .793$.

Of the total sample, 35% of decedents communicated their suicide intent to a romantic partner, 16% to a friend, 14% to a family member, 14% to a helping agency, and 8% to their chain of command (Table 2). Of what was documented in the case files, 20% of the sample communicated their suicide intent to only one recipient, 23% communicated intent to two or more recipients, and 57% had no documented communications of suicide intent. Approximately one quarter of the sample communicated their suicide intent to a peer or professional (26%), with more married decedents ($n = 18$) communicating their intent to peers and pros than unmarried ($n = 9$). A Chi-Square test was used to determine between group differences. There was a significant association between marital status and communication of suicide intent to peer or professionals, $\chi^2(1) = 4.48$, $p = .038$ but it was opposite of the hypothesized direction. The odds that a decedent had communicated suicide intent to a peer or professional was nearly two times higher among married individuals as compared to unmarried ($OR = 2.85$, 95% $CI = 1.06 - 7.65$). The estimated effect size for this finding was moderate ($V = .21$).

Marital Status and Utilization of Helping Services 30 Days and 12 Months Prior to Suicide

Approximately one-third of decedents accessed some form of helping services in the 30 days prior to death, with 22% of the sample accessing only one helping service and 11% accessing two or more. Health care services (i.e., MTF or outpatient mental health clinic) were accessed by 26% of the sample in the 30 days prior to death. Mental health services (i.e., outpatient mental health clinic, ADAPT, and family advocacy program) were accessed by 17%. The above percentages include the 14% of the sample that accessed both health care and mental health services. Of the nine individual helping services coded in the SDIT (Table 4), the most frequently accessed service was MTF (19%). Additional data about utilization of helping services within 12 months prior to suicide is shown in Table 5.

A series of Wilcoxon Signed Ranks tests were used to determine if there was a significant difference in the number of decedents who accessed an MTF in the 30 days prior to death as compared to the number who accessed other available helping services. Although the difference between MTF and mental health clinic utilization was not statistically significant ($z = -1.15, p = .251$), there were significantly more decedents who accessed an MTF as compared to all subsequently ranked services, such as chaplain services ($z = -2.71, p = .007$). There were no significant differences between married and unmarried individuals and whether they accessed mental health services ($\chi^2(1) = .98, p = .321$), MTF ($\chi^2(1) = .20, p = .653$), or any available helping services ($\chi^2(1) = .13, p = .721$) in the 30 days prior to death. Similar exploratory analyses were conducted to determine if there was a significant difference in the number of decedents who accessed

an MTF as compared to the number who accessed other available helping services in the 12 months prior to death. There were significantly more decedents who accessed an MTF in the 12 months prior to death than all subsequently ranked services (Table 5), including mental health clinics ($z = 3.18, p = .001$).

Finally, two separate logistic regressions were conducted to examine the relationship between marital status, rank, documented history of alcohol problems and use of health care services in the 30 days and the 12 months prior to death. Marital status was expected to remain a significant predictor of health care services utilization when controlling for the other variables. Since a specific hypothesis was being tested, a forced entry method of entering variables into the model was selected.

In the 30 days prior to death, marital status was not a significant predictor of health care services (i.e., MTF, outpatient mental health clinic) utilization as hypothesized ($p = .434$). However, a documented history of alcohol problems ($p = .030$), African American race ($p = .037$), and officer status ($p = .049$) were significant predictors (see Table 6), even when controlling for the other variables. Decedents with a documented history of alcohol problems were 71% less likely to access health care services as compared to those without. The odds that African Americans would access health care services in the 30 days prior to death were 3.42 times greater than that observed for Caucasians ($OR = 4.42, 95\% CI = 1.09 - 17.95$). Lastly, as decedents increased in rank, they were less likely to access health care services in the 30 days prior to death, with officers being 92% less likely to access health care services as compared to decedents in the ranks of E1-E3.

In the 12 months prior to death, military ranks of E7-E9 ($p = .018$) and officer rank ($p = .047$) were the only significant predictors as shown in Table 7, with increased rank being negatively associated with accessing health care services. As compared to decedents ranked E1-E3, those ranked E7-E9 were 90% less likely to access health care services and officers were 87% less likely to access health care services. Although race came close to being significant as a predictor ($p = .060$), neither African American ($p = .121$) nor “other” ($p = .105$) race categories were significantly different from the reference group, Caucasians.

Discussion

Our sample consisted predominately of Caucasian males with ranks of E4 to E6. The low numbers of observed female suicides were not surprising in view of the 3:1 male to female ratio observed across the USAF and the 4:1 male to female ratio commonly observed in suicides (AFPC, 2009; CDC, 2004). Although the average age of 32 at time of death was slightly older than what one would expect based on US Army data, this finding is congruent with previous USAF research (Patterson et al., 2001; Staal & Hughes, 2002). The racial distribution of our sample (e.g., 72% Caucasian, 13% African American, 8% Hispanic, 5% Asian, 2% other) is comparable to the reported total force composition (AFPC, 2009). Forty-one percent of the sample had some marker of alcohol misuse

Life Stressor Precipitants 24 Hours Prior to Suicide

Surprisingly, there were no between group differences among married and unmarried decedents in the cumulative number of life stressor precipitants 24 hours prior to suicide death. Previous research has demonstrated that life stressor precipitants, such

as interpersonal conflicts, romantic problems, and loss events, are identifiable in approximately half of all suicides (Cavanagh et al., 1999, Cheng et al., 2000; Phillips et al., 2002; Kolves et al., 2006). Our findings appear to suggest that married individuals who die by suicide are not facing a higher number of life stressors prior to death. While this finding does not suggest that married decedents are qualitatively similar in their stress to unmarried decedents, it does suggest that the quantity of stressors does not significantly differ among these two groups.

In addition, we found that married decedents were two times more likely to have had interpersonal life stressor precipitants. Arguably, married individuals may have had more opportunity for interpersonal conflict than unmarried by sheer virtue of their marital relationship. However, the *interpersonal conflict* variable was constructed by collapsing variables that captured interpersonal conflict for both marital groups (i.e., argument or fight with spouse, significant other, or family; end of relationship with spouse, significant other, or family). Since there is no way for us to systematically determine the number of social relationships for married versus unmarried decedents, we are limited in our interpretation of this finding. One explanation may be that married decedents, in general, have either a higher number of social relationships or a higher contact rate in such relationships as compared to unmarried decedents which then subsequently provides for a greater likelihood of experiencing interpersonal conflict. Suicide prevention efforts could be tailored to the needs of married individuals by focusing on educational topics such as relationship building, communication, and conflict resolution.

Considering that the civilian literature cites identifiable life stressor precipitants in 80% of suicides, our finding that unmarried decedents were significantly more likely to

have an absence of documented life stressor precipitants seems noteworthy. Perhaps the operational definition of life stressor precipitants used for this study (i.e., 24 hours prior to suicide) did not capture life stressors that are either more salient, or less acute, for unmarried persons. It is unlikely that unmarried decedents were without stressors. It is more likely that unmarried decedents had life stressor precipitants that were not identified and recognized by those in the social circle. Therefore, this finding is probably more reflective of a low level of interpersonal connectedness with others resulting in an inability of informants to retrospectively identify or report precipitants to AFOSI. Further, social isolation may be a key stressor for unmarried individuals, which aligns with the thwarted belongingness component of Joiner's (2005) theory. Another plausible explanation may be that unmarried decedents' suicide behavior was more driven by psychopathology and/or long-standing problems and less driven by immediate situational stressors. While we are limited in what can be inferred regarding between group differences, these two findings taken together point to an important area for future investigation. Specifically, it will be important to determine if these groups truly experience different types and frequency of stressors, whether these findings are related to differences in reporting issues, or if this is perhaps driven by some third variable. The finding about the absence of life stressor precipitants for unmarried decedents also has important implications for the AFSPP agenda. We strongly recommend that policy makers pay close attention to the needs of unmarried and possibly isolated service members in constructing any suicide prevention efforts.

Distress Communication

There were no between group differences in the number of interpersonal themes of distress even though life stressor precipitants related to interpersonal conflict were more common among married decedents. Intrapersonal distress communication with themes of stress, depression, and psychological pain were observed in 66% of our suicide decedents. Interpersonal distress communication with themes of thwarted belongingness, rejection, and loneliness were observed in 55% of our suicide decedents. These findings imply that the AF suicide prevention efforts should be directly targeted at two groups of individuals: 1) those who are experiencing stress, changes in mood, and psychological pain, and 2) those who are experiencing social isolation, peer rejection, and loneliness. Married and unmarried decedents did not differ on the number of interpersonal distress communication prior to suicide death. This finding is interesting in light of our earlier finding that unmarried decedents had a notable absence of life stressor precipitants 24 hours prior to suicide death. Thus, it could be the case that an unmarried individual does not experience a life stressor precipitant 24 hours prior to suicide but does communicate distress related to suicide intent prior to death.

Similar to what is noted in civilian suicides, romantic partners were the most common recipient (35%) of suicide intent communications across the current sample. Important questions, such as whether the person who received the suicide intent communication referred the individual or the appropriateness and adequacy of any referrals, were not assessed in the current study. Based on the civilian literature that cites single individuals and those with disrupted marital status as more likely to seek professional help, our finding that married individuals were more likely to communicate their suicide intent to a peer or professional was unanticipated. Moreover, it was expected

that unmarried individuals would turn to peers and professionals since they do not have a spouse as their primary social support or confidant. It is also unclear if married decedents were prompted by their spouse to communicate their intent to a peer or professional or if their decision to confide in peers and professionals was a result of marital problems. It is important to note, though, that all cases died by suicide despite communicating their intent.

Helping Services Utilization

Married and unmarried decedents did not differ on their usage of MTF and any other helping services prior to suicide death. Only 33% of the total sample accessed any available helping service in the month prior to death, with MTF (19%) and outpatient mental health services (14%) ranking as the top two services utilized. There are two notable differences involving the findings of the current study and the civilian literature. First, the disparity between MTF and mental health services utilization is less marked than what is cited between civilian primary care settings (50-75%) and mental health services (25%). Second, rates of MTF utilization in the month prior to suicide are substantially lower than what is reported in the civilian literature. Therefore, it appears that overall AF suicide decedents are seeking helping services at a lower rate than their civilian counterparts. While it is possible that the lower utilization of MTF services and the decreased discrepancy between MTF and outpatient mental health use are attributable to a more healthy population and reduced stigma, a research examining stigma and career concerns in relation to mental health issues (Rowan & Campise, 2006) makes this scenario improbable. A more plausible explanation is that USAF members that die by

suicide are reluctant to utilize services, regardless of resource. Prevention efforts need to at least, aim to increase the likelihood of a MTF visit for distressed AF personnel.

Military rank predicted helping services utilization 30 days and 12 months prior to suicide death. Based on anecdotal evidence and the military literature on mental health care stigma, the finding that increasing rank was negatively associated with health care services utilization in the 30 days and 12 months prior to death was anticipated. It is not difficult to fathom that as individuals increase in rank, they may become more concerned about the implications, real or imagined, of seeking help for a mental health concern. However, the negative relationship between documented alcohol misuse history and utilization of health care services in the 30 days prior to death is counterintuitive. In the USAF, we would expect that individuals with a documented history of alcohol misuse would be closely monitored by both the military health care system and their chain of command due to safety and mission related concerns. The fact that our research indicates that 71% of those with documented alcohol histories were less likely to access health care services 30 days prior to death is also somewhat alarming. We recommend that the AF suicide prevention efforts pay close attention to the role of alcohol in suicide behavior and generate strategies for better detection and earlier referral for mandatory helping services.

The finding that African Americans were over 3 times more likely to utilize health care services 30 days prior to death as compared to Caucasians is not previously presented in suicide literature and deserves careful attention. The civilian literature comparing utilization patterns of African Americans and Caucasians for mental health concerns is mixed (Broman, 1987; Neighbors, 1985). Even though African Americans

were more likely to have utilized health care services in the 30 days prior to death, they still died by suicide. To our knowledge, there is no civilian or military research to date examining if African Americans have a different clinical presentation from Caucasians when contemplating suicide. Future research may investigate the presenting problems in each group in order to more closely examine any possible racial differences in clinical presentation,

Strengths and Limitations

As a retrospective psychological autopsy study, the potential for recall bias exists. Using a case-controlled design can help to mitigate this bias as long as the same methods of information gathering are used for both cases and controls. While a case-controlled study of these data is certainly recommended for future research, selecting the most appropriate control group for suicide cases and determining the best variables for matching cases and controls is problematic. For instance, controls who have died prematurely from unnatural causes often have similar risk factors as suicide deaths, live psychiatric inpatients and attempters are different demographically and by the fact that they are in contact with psychiatric care, and since living controls are volunteers, they are a self-selecting sample (Pouliot & De Leo, 2006). Nevertheless, the psychological autopsy, and our choice of comparison groups, are the most appropriate to address the research questions of the current study.

Our sampling strategy and size are also limits to the current study. Since 60 cases were randomly selected from all case files 1996-2006 and 40 cases were consecutively selected starting with suicides that occurred in 2000, there is an over-representation of suicides that occurred between 2000-2002. However, continuing the random sampling

strategy was not aligned with the strategic vision for the AFOSI data of a comprehensive database of all USAF suicides. Although our sample size was sufficient and our analyses were adequately powered, it limited the number of predictor variables that could be examined in the logistic regression model. Increasing the sample size in future investigations will allow for testing more predictor variables, as well as interactions, and provide the ability to make more discriminating comparisons between certain subgroups (i.e., married, separated, single, and divorced).

Since we were using investigatory data, there is inevitably some variability between files, resulting in missing data. If a variable was not explicitly annotated in the case file, coders treated it as if the variable was not present. While it is impossible to definitively rule out the potential that a variable was actually present but not recorded, the thorough nature of AFOSI investigations (i.e. trained agents, following legal rules of evidence, converging sources of data, etc.) makes this likelihood low. Furthermore, focusing on clearly identifiable indicators of risk arguably holds greater potential to impact detection and intervention efforts as opposed to focusing on more subtle indicators of risk.

Despite the above limitations, this study has a number of unique strengths. There are multiple sources of both subjective (i.e., interviews) and objective (i.e., services utilization, toxicology reports, job performance records, etc.) data that exceeds the level of detail and rigor of many psychological autopsy studies. To illustrate, each AFOSI case file typically contains five or more interviews of people known by the decedent, whereas many published psychological autopsy studies use only 1-2 interviews to draw inferences. Multiple sources of data also allows for corroboration of evidence, which

increases reliability and confidence in our findings. Moreover, the AFOSI data has not been fully analyzed to date. This will be the first effort to interpret all of the data collected. Lastly, this project is in close collaboration with the AFSPP and has the potential to directly contribute to their suicide prevention efforts.

Implications and Future Directions

The frequency of alcohol misuse behavior in the sample may be indicative that an alcohol culture (i.e., “work hard, play harder”) is still in existence in the USAF. Although informants are clearly identifying the presence of this particular risk indicator, it is unclear whether they fully recognize that alcohol misuse is strongly associated with suicide or why they are not referring at risk persons for help. Emphasizing the relationship between alcohol and suicide during annual suicide prevention training may help to better educate airmen about risk. Considering that decedents with a documented alcohol history were less likely to utilize helping services utilization, informing airmen about the protections afforded to those that self-refer for substance treatment, as outlined in Air Force Instruction 44-121, Alcohol and Drug Abuse Prevention and Treatment (ADAPT) Program, may reduce fears of career implications and encourage help seeking for substance related issues. Lastly, future research may be interested in examining how the 2006 *Culture of Responsible Choices* campaign aimed at deglamorizing alcohol has impacted the role of alcohol in suicides.

With interpersonal conflict being the most common life stressor precipitant observed in this sample of USAF suicides, it appears that this facet of military life should be focused on preemptively. Perhaps conflict resolution training, or easy access to couples counseling, regardless of marital status, may be warranted. An extension of the

Military Family Life Consultant model or something similar (i.e., prepaid, clinicians with a minimum of master's level training, no connection with military chain of command) may be helpful in disarming service-members' concerns over stigma and career implications. It will also be important for future investigations, perhaps during annual suicide training or unit climate assessment surveys, to determine if unmarried individuals perceive that they are socially connected to others and take corrective action if not. Despite the "Wingman" concept regularly reinforced in the USAF doctrine, our data suggest that some personnel may still be relatively isolated at the time of suicide.

Romantic partners were most likely to receive advance verbal communication of someone's intent to die by suicide. It is unclear if military spouses and significant others are aware of who to contact if someone states their intent to die or conveys their distress. It may be useful to provide selected modules of the annual suicide prevention training to extended families, friends, and romantic partners of USAF personnel. Military One Source or similar web based format may be a feasible method of disseminating this information.

It will also be important to clarify the negative relationship between rank and helping services utilization observed in the current data. If this reluctance is related to career concerns, the recent policy change forbidding denial or removal of security clearances for those utilizing services for combat related mental health issues may help. If the reluctance is more related to stigma, the recent trend of high ranking DoD personnel openly discussing their problems and help seeking experiences appears to be a step in the right direction. More research is also needed to understand why African Americans had more contact with available helping services prior to death than Caucasians yet were still

not detected or treated adequately. Is this an anomaly in our dataset or are African Americans truly presenting differently? Little is known regarding race and suicide distress presentation.

Lastly, many USAF members who die by suicide are going to MTF for what are arguably mental health issues. Future research should examine if the decision to go to MTF, as opposed to an outpatient mental health clinic, is moderated by stigma or some third variable. It is unknown at this point why these individuals that contacted MTF prior to death were not detected. Future research in civilian and military primary care settings may be useful to determine whether: a) physicians are not assessing for suicidality during their medical encounters, or b) individuals that present to primary care and later die by suicide have a different clinical presentation than what is currently being assessed.

While we are enthusiastic that our findings fill some existing gaps in the literature and more discriminately describe the characteristics of USAF personnel that die by suicide, it is clear that more work is still needed. A case-controlled psychological autopsy methodology, with an appropriate control group, examining similar variables in future investigations will be the logical next step. One type of an appropriate control group could consist of death cases due to accidents. We have explored the possibility of conducting such a study. However, the AFOSI conducts a much less detailed investigation of accident cases and much of the information collected in the suicide cases is non-existent in these cases. Additional funding by DoD could assist in the conduct of a comprehensive case controlled investigation as recommended here.

Table 1

Sample Demographics

Variable	Total	Married	Unmarried
	N = 100	n = 52 (%)	n = 48 (%)
Demographics			
Race			
Caucasian	72	39 (75.0)	33 (68.8)
Black	13	5 (9.6)	8 (16.7)
Hispanic	8	5 (9.6)	3 (6.3)
Asian	5	1 (1.9)	4 (8.3)
Other	2	2 (3.8)	0 (--)
Gender			
Male	94	50 (96.2)	44 (91.7)
Female	6	2 (3.8)	4 (8.3)
Rank			
E1 – E3	25	8 (15.3)	17 (35.4)
E4 – E6	54	30 (57.6)	24 (50)
E7 – E9	10	8 (15.3)	2 (4.2)
O1 – O3	3	1 (1.9)	2 (4.2)
O4 – O6	5	4 (7.6)	1 (2.1)
O7 – O10	n/a	n/a	n/a
Missing Rank	3	n/a	n/a

Note. Values represent observed frequencies in the SDIT with % of subgroup represented in parentheses.

* $p < .05$, ** $p < .01$.

Table 2

Life Stressor Precipitants and Communication Prior to Suicide

Variable	Total N = 100	Married n = 52 (%)	Unmarried n = 48 (%)
Suicide Precipitants^a			
Average Number of Precipitants	1.72	1.88	1.54
Interpersonal Conflicts**	54	35 (67.3)	19 (39.6)
Other Precipitants	40	19 (36.5)	21 (43.8)
Communication of Suicide Intent			
Recipients of Communication			
Romantic Partner	35	21 (40.4)	14 (29.2)
Friend or Coworker	16	9 (17.3)	7 (14.6)
Family Member	14	9 (17.3)	5 (10.4)
Helping Services	14	10 (19.2)	4 (8.3)
Non-helping professional	12	9 (17.3)	3 (6.3)
Professional*	11	9 (17.3)	2 (4.2)
Supervisory Chain*	8	7 (13.5)	1 (2.1)
Themes of Distress Communicated			
Intrapersonal Related Theme	71	35 (67.3)	36 (75.0)
Interpersonal Related Theme	66	33 (63.5)	33 (68.8)

Note. Values represent observed frequencies in the SDIT with % of subgroup represented in parentheses.

^a Precipitants were coded for 24 hours prior to suicide.

* $p < .05$, ** $p < .01$.

Table 3

Number of Documented Life Stressor Precipitants for 24 Hours Prior to Suicide

Number of Precipitants	Total N = 100	Married n = 52 (%)	Unmarried n = 48 (%)
None*	26	9 (17.3)	17 (35.4)
One	21	13 (25.0)	8 (16.7)
Two	29	17 (32.7)	12 (25.0)
Three	14	8 (15.4)	6 (12.5)
Four	3	1 (1.9)	2 (4.2)
Five	3	1 (1.9)	2 (4.2)
Six	4	3 (5.8)	1 (2.1)

Note. Values represent observed frequencies in the SDIT with % of subgroup represented in parentheses.

* $p < .05$.

Table 4

Percentage of Helping Services Utilization 30 Days Prior to Suicide

Variable	Total	Married	Unmarried
Categories of Services Utilized in 30 Days Prior to Suicide			
Any Helping Service	33	19	14
Health Care Services	26	15	11
Mental Health Services	17	12	5
Individual Services Utilized in 30 Days Prior to Suicide			
MTF	19	10	9
Mental Health Clinic	14	10	4
ADAPT	2	1	1
Family Advocacy	4	4	--
Family Support Services	--	--	--
Financial Services	2	2	--
Legal	--	--	--
Chaplain	6	3	3
Child and Youth Services	--	--	--

Table 5

Percentage of Helping Services Utilization 12 Months Prior to Suicide

Variable	Total	Married	Unmarried
Categories of Services Utilized in 12 Months Prior to Suicide			
Any Helping Service	58	33	25
Health Care Services	49	28	21
Mental Health Services	29	18	11
Individual Services Utilized in 12 Months Prior to Suicide			
MTF	42	32	19
ADAPT	8	4	4
Family Advocacy	7	6	1
Family Support Services	4	3	1
Financial Services	4	3	1
Legal	5	4	1
Chaplain	9	5	4
Child and Youth Services	--	--	--

Table 6

Logistic Regression Analysis of Predictors of Health Care Services Utilization 30 days

Prior to Suicide

Variables Included	β	<i>SE</i>	Adjusted OR	(95% CI)
Constant	-0.22	0.54		
Alcohol Problem	-1.25*	0.58	0.29	(0.09 - 0.88)
Marital Status	0.42	0.54	1.52	(0.53 - 4.34)
Race Categories ^a				
African American	1.49*	0.71	4.42	(1.09 - 17.95)
Other Race ^b	0.33	0.77	1.39	(0.31 - 6.31)
Rank ^c				
E4-E6	-1.07	0.60	0.34	(0.11 - 1.12)
E7-E9	-1.39	1.02	0.25	(0.03 - 1.82)
Officers	-2.52*	1.28	0.08	(0.01 - 0.99)

Note: $R^2 = .19$ (Nagelkerke). Hosmer and Lemeshow $\chi^2(7) = 3.18, p = .868$.

OR = Odds Ratio. CI = Confidence Interval.

^a Race category of Caucasian used as reference category.

^b Other race is comprised of Asian, Hispanic, and other.

^c Rank category of E1-E3 used as reference category.

* $p < .05$.

Table 7

Logistic Regression Analysis of Predictors of Health Care Services Utilization 12 Months
Prior to Suicide

Variables Included	β	<i>SE</i>	Adjusted OR	(95% CI)
Constant	0.33	0.51		
Alcohol History	0.35	0.47	1.41	(0.90 - 1.25)
Marital Status	0.60	0.47	1.83	(0.73 - 4.61)
Race Categories ^a				
African American	1.15	0.74	3.14	(0.74 - 13.34)
Other Race ^b	-1.09	0.67	0.34	(0.09 - 1.25)
Rank ^c				
E4-E6	-0.72	0.54	0.49	(0.17 - 1.40)
E7-E9	-2.32*	0.98	0.10	(0.01 - 0.68)
All Officers	-2.03*	1.03	0.13	(0.02 - 0.98)

Note: $R^2 = .19$ (Nagelkerke). Hosmer and Lemeshow $\chi^2(8) = 4.68, p = .792$.

OR = Odds Ratio. CI = Confidence Interval.

^a Race category of Caucasian used as reference category.

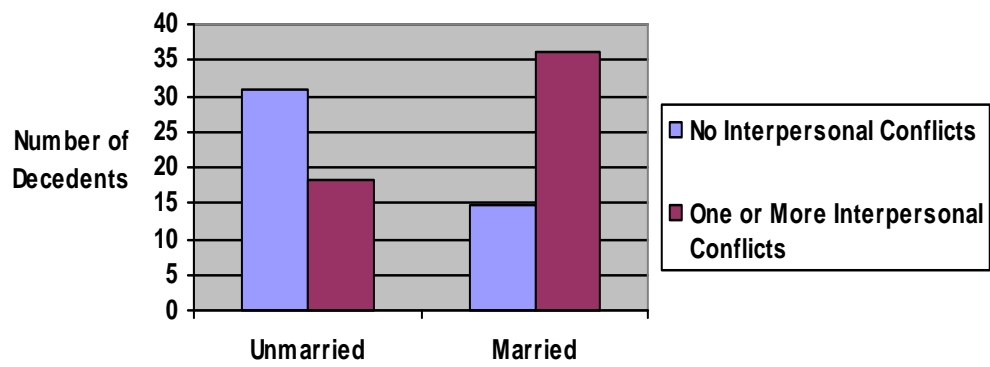
^b Other race is comprised of Asian, Hispanic, and other.

^c Rank category of E1-E3 used as reference category

* $p < .05$.

Figure 1

Interpersonal Conflicts among Married and Unmarried Decedents



References

- Air Force Personnel Center (AFPC) (2009). Air Force demographics. Retrieved May 20, 2009 from <http://www.afpc.randolph.af.mil/library/airforcepersonnelstatistics.asp>
- Allen, J. P., Cross, G., & Swanner, J. (2005). Suicide in the Army: A review of current information. *Military Medicine*, 170(7), 580-584.
- Army Medical Surveillance Activity (2005). Medical Surveillance Monthly Report [Electronic Version], 11. Retrieved October 6, 2006 from http://amsa.army.mil/1Msmr/2005/v11_no03.pdf
- Army Suicide Event Surveillance Report (ASER) (2007). Retrieved January 5, 2009 from http://media.mcclatchydc.com/smedia/2008/05/29/19/Army-Suicide.source.prod_affiliate.91.pdf
- Arsenault-LaPierre, G., Kim, C., & Turecki, G. (2004). Psychiatric diagnoses in 3275 suicides: A meta-analysis. *BioMed Central Psychiatry*, 4, 37-47.
- Beautrais, A. L., Joyce, P. R., & Mulder, R. T. (1997). Precipitating factors and life events in serious suicide attempts among youths aged 13 through 24 years. *Journal of the American Academy of Child & Adolescent Psychiatry*, 36, 1543-1551.
- Berman, A. L., Jobes, D. A., & Silverman, M. M. (2006). *Adolescent Suicide: Assessment and Intervention* (2nd ed., Vol. ix). Washington, DC: American Psychological Association.
- Broman, C. L. (1987). Race differences in professional help seeking. *American Journal of Community Psychology*, 15, 473-489.

- Brown, G. K., Beck, A. T., Steer, R. A., & Grisham, J. R. (2000). Risk factors for suicide in psychiatric outpatients: A 20-year prospective study. *Journal of Consulting and Clinical Psychology, 68*, 371–377.
- Bullman, T. A., & Kang, H. K. (1996). The risk of suicide among wounded Vietnam veterans. *American Journal of Public Health, 86*, 662-667.
- Canter, C., Giles, S., & Nicol, C. (2004). Suicide without explicit precursors: A state of secret despair? *Journal of Investigative Psychology and Offender Profiling, 1*(3), 227-248.
- Cantor, C., & Slater, P. (1995). Marital breakdown, parenthood and suicide, *Journal of Family Studies, 1*, 91-102.
- Carr, J. R., Hoge, C. W., Gardner, J., & Potter, R. (2004). Suicide surveillance in the U.S. military: Reporting and classification biases in rate calculations. *Suicide and Life-Threatening Behavior, 34*(3), 233-241.
- Cavanagh, J. T. O., Carson, A. J., Sharpe, M., & Lawrie, S. M. (2003). Psychological autopsy studies of suicide: A systematic review. *Psychological Medicine, 33*(3), 395-405.
- Cavanagh, J. T. O., Owens, D. G. C., & Johnstone, E. C. (1999). Suicide and undetermined death in south east Scotland. A case-control study using the psychological autopsy method. *Psychological Medicine, 29*(5), 1141-1149.
- Centers for Disease Control and Prevention (CDC) (1999). *Morbidity and Mortality Weekly Report, 48*(46), 1053-1057.

- Centers for Disease Control and Prevention (CDC) (2004). Web-based injury statistics query and reporting system (WISQARS) [On-line]. Retrieved December 2006 from www.cdc.gov/ncipc/wisqars/default.htm
- Centers for Disease Control and Prevention (CDC) (2007). Web-based Injury Statistics Query and Reporting System (WISQARS). Retrieved August 2, 2007 from www.cdc.gov/ncipc/wisqars
- Chen, E. Y. H., Chan, W. S. C., Wong, P. W. C., Chan, S. S. M., Chan, C. L. W., Law, Y. W., et al. (2006). Suicide in Hong Kong: A case-control psychological autopsy study. *Psychological Medicine*, 36(6), 815-825.
- Cheng, A. T. A., Chen, T. H. H., Chen, C. C., & Jenkins, R. (2000). Psychosocial and psychiatric risk factors for suicide: Case-control psychological autopsy study. *British Journal of Psychiatry*, 177(4), 360-365.
- Claassen, C. A., & Larkin, G. L. (2005). Occult suicidality in an emergency department population. *British Journal of Psychiatry*, 186, 352-353.
- Clark, D. C., & Horton-Deutsch, S. L. (1992). Assessment in absentia: The value of the psychological autopsy method for studying antecedents of suicide and predicting future suicides. In R. W. Maris, A. L. Berman, J.T. Maltsberger, & R.I. Yufit (Eds.), *Assessment and prediction of suicide*. (pp. 144-182). New York: Guilford.
- Department of Defense (2009). *Department of Defense Suicide Prevention Conference*. Retrieved March 10, 2009, from http://www.dcoe.health.mil/event_docs/suicide_prevention_conf/2009_Suicide_Prevention_Conf_Agenda.pdf
- Department of Health and Human Services [DHHS]. (2007). Table 46. Death rates for

- suicide, by sex, race, Hispanic origin, and age: United States, selected years 1950-2005. Retrieved December 14, 2008 from <http://www.cdc.gov/nchs/data/hus/hus07.pdf#046>
- Foster, T. (2003). Suicide note themes and suicide prevention. *International Journal of Psychiatry in Medicine*, 33(4), 323-331.
- Goldsmith, S. K., Pellmar, T. C., Kleinman, A. M., & Bunney, W. E. (2002). *Reducing suicide: A national imperative*. Washington, DC: National Academies Press.
- Hauschild, T. B. (1968). Suicidal population of a military psychiatric center: A review of ten years. *Military Medicine*, 133(6), 425-437.
- Hawton, K., Appleby, L., Platt, S., Foster, T., Cooper, J., Malmberg, A., et al. (1998). The psychological autopsy approach to studying suicide: A review of methodological issues. *Journal of Affective Disorders*, 50, 269-276.
- Heikkinen, M., Aro, H., & Lonnqvist, J. (1992). Recent life events and their role in suicide as seen by the spouses. *Acta Psychiatrica Scandinavica*, 86, 489-494.
- Hoge, C. W., Auchterlonie, J. L., & Milliken, C. S. (2006). Mental health problems, use of mental health services, and attrition from military service after returning from deployment to Iraq or Afghanistan. *Journal of the American Medical Association*, 295(9), 1023-1032.
- Humeau, M., Papet, N., Jaafari, N., Gotzamanis, L., Lafay, N., & Senon, J. (2007). Availability of firearms and risk of suicide: A review of the literature. *Annales Medico-Psychologiques*, 165(4), 269-275.
- Institute of Medicine (IOM) (2007). Gulf War and health: Volume 6. physiologic, psychologic, and psychosocial effects of deployment-related stress. Retrieved

January 5, 2009 from

http://books.nap.edu/openbook.php?record_id=11922&page=11

Isometsa, E. T. (2001). Psychological autopsy studies: A review. *European Psychiatry*, 16(7), 379-385.

Joiner, T. E. (2005). *Why people die by suicide*. Cambridge: Harvard University Press.

Kessler, R. C., Berglund, P., Borges, G., Nock, M., & Wang, P. S. (2005). Trends in suicide ideation, plans, gestures, and attempts in the United States, 1990-1992 to 2001-2003. *Journal of the American Medical Association*, 293(20), 2487-2495.

Kessler, R. C., Borges, G., & Walters, E. E. (1999). Prevalence of and risk factors for lifetime suicide attempts in the National Comorbidity Survey. *Archives of General Psychiatry*, 56(7), 617-626.

Knox, K. L., Litts, D. A., Talcott, W. G., Feig, J. C., & Caine, E. D. (2003). Risk of suicide and related adverse outcomes after exposure to a suicide prevention programme in the US Air Force: Cohort study. *British Medical Journal*, 327, 1376-1378.

Kolves K, Varnik A, Schneider B, Fritze J, & Allik J. (2006). Recent life events and suicide; A case-control study in Tallinn and Frankfurt. *Social Science & Medicine*, 62, 2887-2896

Kposowa, A. J. (2000). Marital status and suicide in the National Longitudinal Mortality Study. *Journal of Epidemiology & Community Health*, 54(4), 254-261.

Lee, H. C., Lin, H. C., Liu, T. C., & Lin, S. Y. (2008). Contact of mental and nonmental health care providers prior to suicide: A population based study. *Canadian Journal of Psychiatry*, 53, 377-383.

- Leenaars, A. A., Lester, D., Wenckstern, S., McMullin, C., & et al. (1992). Comparison of suicide notes and parasuicide notes. *Death Studies*, 16(4), 331-342.
- Levin, A. (2008). Suicide among soldiers still rising as stress piles up *Psychiatric News*, 43, 1-27.
- Lin, E., Goering, P., Offord, D. R., Campbell, D., & Boyle, M. H. (1996). The use of mental health services in Ontario: Epidemiologic findings. *Canadian Journal of Psychiatry*, 41, 572-577.
- Luoma, J. B., Pearson, J. L., & Martin, C. E. (2002). Contact with mental health and primary care prior to suicide: A review of the evidence. *American Journal of Psychiatry*, 159, 909-916.
- Mann, J. J., Apter, A., Bertolote, J., Beautrais, A., Currier, D., Haas, A., et al. (2005). *Suicide Prevention Strategies: A Systematic Review*, 294, 2064-2074.
- Martin, J., Ghahramanlou-Holloway, M., Lou, K., & Tucciarone, P. (2009). A comparative review of U.S. military and civilian suicide behavior: Implications for OEF/OIF suicide prevention efforts. *Journal of Mental Health Counseling*, 31(2), 101-118.
- Marttunen, M. J., Aro, H. M., & Lonnqvist, J. K. (1993). Adolescence and suicide: A review of psychological autopsy studies. *European Child & Adolescent Psychiatry*, 2, 10-18.
- Moscicki, E. K. (1995). Epidemiology of suicidal behavior. *Suicide and Life-Threatening Behavior*, 25(1), 22-35.
- Nademin, E., Jobes, D. A., Pflanz, S. E., Jacoby, A. M., Ghahramanlou-Holloway, M., Campise, R., Joiner, T., Wagner, B. M., & Johnson, L. (2008). An investigation of

- interpersonal-psychological variables in Air Force suicides: A controlled-comparison study. *Archives of Suicide Research*, 12(4), 309-326.
- Neighbors, H. W. (1985). Seeking professional help for personal problems: Black Americans use of health and mental health services. *Community Mental Health Journal*, 21, 156-166.
- Nock, M. K., Borges, G., Bromet, E., Cha, C. B., Kessler, R. C., & Lee, S. (2008). Suicide and suicidal behaviors. *Epidemiologic Reviews*, 30, 133-154.
- Patterson, J. C., Jones, D. R., Marsh, R. W., & Drummond, F. E. (2001). Aeromedical management of U.S. Air Force aviators who attempt suicide. *Aviation, Space, and Environmental Medicine*, 72(12), 1081-1085.
- Phillips, M. R., Yang, G., Zhang, Y., Wang, L., Ji, H., & Zhou, M. (2002). Risk factors for suicide in China: A national case-control psychological autopsy study. *Lancet*, 360(9347), 1728-1736.
- Pouliot, L. & De Leo, D. (2006). Critical issues in psychological autopsy studies. *Suicide and Life-Threatening Behavior*, 36, 491-510.
- Prigerson, H. G., Maciejewski, P. K., & Rosenheck, R. A. (1999). The effects of marital dissolution and marital quality on health and health service use among women. *Medical Care*, 37, 858-873.
- Rea, L. M., & Parker, R. A. (1992). *Designing and Conducting Survey Research*. San Francisco: Jossey-Bass.
- Resnick, M. D., Bearman, P. S., Blum, R. W., Bauman, K. E., Harris, K. M., Jones, J., et al. (1997). Protecting adolescents from harm: Findings from the National

- Longitudinal Study on adolescent health. *Journal of the American Medical Association*, 278(10), 823-832.
- Rihmer, Z. (2007). Suicide risk in mood disorders. *Current Opinion in Psychiatry*, 20(1), 17-22.
- Ritchie, E. C., Keppler, W. C., & Rothberg, J. M. (2003). Suicidal admissions in the United States Military. *Military Medicine*, 168(3), 177-181.
- Robins, E., Gassner, S., Kayes, J., Wilkinson, R. H., Jr., & Murphy, G. E. (1959). The communication of suicidal intent: A study of 134 consecutive cases of successful suicide. *American Journal of Psychiatry*, 115, 724-733.
- Rowan A., & Campise R., (2006). A multi-site study of Air Force outpatient behavioral health treatment-seeking patterns and career impact. *Military Medicine*, 171, 1123-1127.
- Shneidman, E. S. (1994). The psychological autopsy. *American Psychologist*, 49(1), 75-76.
- Shneidman, E. S. (1996). *The Suicidal Mind*. New York, NY: Oxford University Press.
- Silverman, J. M., Pinkham, L., Horvath, T. B., Coccaro, E. F., & et al. (1991). Affective and impulsive personality disorder traits in the relatives of patients with borderline personality disorder. *American Journal of Psychiatry*, 148(10), 1378-1385.
- Smith, J., Mercy, J., & Conn, J. (1988). Marital status and the risk of suicide. *American Journal of Public Health*, 78, 78-80.

- Staal, M. A., & Hughes, T. G. (2002). Suicide prediction in the US Air Force: Implications for practice. *Professional Psychology: Research and Practice*, 33(2), 190-196.
- Stack, S. and Wasserman, I. (1993) Marital status, alcohol consumption, and suicide: an analysis of national data. *Journal of Marriage and the Family*, 55, 1018–1024.
- Stander, V. A., Hilton, S. M., Kennedy, K. R., & Robbins, D. L. (2004). Surveillance of completed suicide in the Department of the Navy. *Military Medicine*, 169(4), 301-306.
- Trent, L. K. (1999). Parasuicides in the Navy and Marine Corps: Hospital admissions, 1989-1995. *US Naval Health Research Center Report Rpt No 99-4D*, 1-36.
- Vastag, B. (2001). Suicide prevention plan calls for physicians' help. *Journal of the American Medical Association*, 285, 2701-2703.
- Wang, P. S., Lane, M., Olfson, M., Pincus, H. A., Wells, K. B., & Kessler, R. C. (2005). Twelve-month use of mental health services in the United States: Results from the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62, 629-640.
- Wyder, M., Ward, P., & De Leo, D. (in press). Separation as a suicide risk factor. *Journal of Affective Disorders*.